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a wheel-less wiring head which guides an optical fiber to a lead end thereof along a guide groove through which the optical fiber slides into position on the wiring substrate, the guide groove extending partially along a length of the wiring head and forming an optical fiber path;

an optical fiber feed means which feeds said optical fiber during the wiring operation into said optical fiber path of said wiring head;

an optical fiber contacting means, which brings said optical fiber, which has been guided to said lead end of said wiring head via said optical fiber path, and said wiring substrate into contact, wherein the optical fiber contacting means includes an optical fiber pressing means for pressing said optical fiber against said wiring substrate with a predetermined pressure;

an XY movement means, which moves said wiring substrate and said wiring head relative to one another in the X and Y directions in the state in which said optical fiber at said lead end of said wiring head has been placed in contact with said wiring substrate by said optical fiber contacting means; and

an optical fiber affixing means, which successively affixes, to said wiring substrate, said optical fiber which has been brought into contact with said wiring substrate during movement by said XY movement means wherein in the wheel-less wiring head, a pressure groove connected to said guide groove is formed with a radius of curvature larger than the radius of curvature at which said optical fiber breaks, so as to support the optical fiber in a state in which it is bent by a fixed amount and is pressed onto said wiring substrate.

2. (Amended) An optical fiber wiring apparatus in accordance with claim 1,
wherein

B2 said optical fiber within said optical fiber path of said wiring head is
successively drawn out when the optical fiber at the lead end of said wiring head is
successively affixed by said optical fiber affixing means, and
said optical fiber feed means feeds said optical fiber stocked in said optical
fiber path which successively draws out said optical fiber.

B3 3. (Twice Amended) An optical fiber wiring apparatus in accordance with
claim 1, wherein

at least a lead end of said wiring head has a hemispherical shape and the guide
groove guides said optical fiber to the hemispherical part,
said pressure groove is formed in said hemispherical part, and
said optical fiber is guided to the lead end of said wiring head via said guide groove
and said pressure groove.

B4 19. (Twice Amended) An optical fiber wiring apparatus which lays optical
fibers down on a wiring substrate, comprising:

a manipulator which is disposed in a plane which is approximately parallel to the
surface of said wiring substrate in a movable manner, and which conducts the laying
operation of the optical fibers on said wiring substrate, the manipulator comprising:
an optical fiber feed means for feeding an optical fiber;

a wheel-less wiring mechanism for wiring, onto said wiring substrate, said optical fiber fed by said optical fiber feed means, wherein the wiring mechanism includes an optical fiber pressing means for pressing said optical fiber against said wiring substrate with a predetermined pressure;

B4 a Z axial rotation mechanism which rotates about an axis approximately perpendicular to the surface of said wiring substrate and thereby changes the orientation of the wiring of said wiring mechanism; and

an optical fiber cutting means which cuts said optical fiber fed by said optical fiber feed means wherein in the wheel-less wiring mechanism, said optical fiber is supported by a pressure groove in a state in which it is bent by a fixed amount and is pressed onto said wiring substrate, where said pressure groove is formed with a radius of curvature larger than the radius of curvature at which said optical fiber breaks.

B5 21. (Twice Amended) A wiring method which conducts the wiring of an optical fiber onto a wiring substrate, comprising:

adjusting the feeding of the optical fiber by an optical fiber feed means so that the tension on the optical fiber is within a fixed range;

wiring the optical fiber fed by the optical fiber feed means onto the wiring substrate by a wheel-less wiring mechanism while the optical fiber is guided along a guide groove formed in the wiring mechanism and is pressed against the wiring substrate with a predetermined pressure; and

cutting the optical fiber to a required length for the wiring by an optical fiber cutting means wherein in the wheel-less wiring mechanism, said optical fiber is supported by a pressure groove in a state in which it is bent by a fixed amount and is pressed onto said wiring substrate, where said pressure groove is connected to said guide groove and is formed with a radius of curvature larger than the radius of curvature at which said optical fiber breaks.

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22. (Twice Amended) An optical fiber wiring method which employs an optical fiber wiring apparatus which is provided with a wiring substrate, a wheel-less wiring head which has a guide groove along which an optical fiber is guided, and applies an the optical fiber to said wiring substrate with a predetermined pressure, and an optical fiber feed means which feeds stocked optical fiber, which apparatus moves said wiring substrate and said wiring head relative to one another in the XY directions and conducts wiring operations which form a desired optical fiber wiring pattern on said wiring substrate, comprising;

feeding an optical fiber of predetermined length by said optical fiber feeding means, in a manner unrelated to the wiring, either before or after the wiring operation or both before and after the wiring operation, and thereby producing an optical wiring board having optical fibers of a predetermined length connected to said wiring pattern either before or after said wiring pattern by means of the wiring operation or both before and after said wiring pattern wherein in the wheel-less wiring head, said optical fiber is supported by a pressure groove in a state in which it is bent by a fixed amount and is pressed onto said

wiring substrate, where said pressure groove is connected to said guide groove and is formed with a radius of curvature larger than the radius of curvature at which said optical fiber breaks.

B3 Sub 2 → 23. (Twice Amended) An optical fiber wiring method which employs an optical fiber wiring apparatus which is provided with a wiring substrate, a wheel-less wiring head which is provided with an optical fiber path which guides an optical fiber to a lead end thereof and which applies said optical fiber guided to said lead end to said wiring substrate with a predetermined pressure, and an optical fiber feeding means which feeds stocked optical fiber, which apparatus moves said wiring substrate and said wiring head relative to one another in the XY directions and conducts a wiring operation which forms a predetermined optical fiber wiring pattern on said wiring substrate, comprising:

at the initiation of wiring, moving said wiring head to a wiring initiation position, and

in the state in which said optical fiber has been guided to said lead end of said wiring head along a guide groove formed in the wiring head, pressing said optical fiber against said wiring substrate with said predetermined pressure,

wherein said wiring head is moved along said wiring pattern with respect to said wiring substrate, the required optical fiber is fed into said optical fiber path of wherein said wiring head by said optical fiber feeding means, and wiring is conducted; and

in the wheel-less wiring head, said optical fiber is supported by a pressure groove in a state in which it is bent by a fixed amount and is pressed onto said wiring substrate,

where said pressure groove is connected to said guide groove and is formed with a radius of curvature larger than the radius of curvature at which said optical fiber breaks.

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24. (Twice Amended) An optical fiber wiring method in which an optical fiber is laid on a wiring substrate by a wheel-less wiring head, at least a lead end of which is formed with a spherical surface, which has formed in a side surface part thereof a guide groove which guides an optical fiber to said spherical surface part, and which has a pressure groove which extends from said guide groove to the top part of said spherical surface part, comprising;

at the initiation of wiring, moving said wiring head to a wiring initiation position:

fitting an optical fiber into said pressure groove;

pressing the optical fiber against said wiring substrate with a predetermined pressure; and

moving said wiring head along said wiring pattern with respect to said wiring substrate to thereby conduct said wiring wherein said pressure groove is formed with a radius of curvature larger than the radius of curvature at which said optical fiber breaks.

Please add new claims 26 and 27 as follows:

26. (New) An optical fiber wiring apparatus in accordance with claim 1,
wherein said guide groove has a deeper portion for inserting said optical fiber, so as to
facilitate the insertion of the lead end of the optical fiber.

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27. (New) An optical fiber wiring apparatus in accordance with claim 1,
wherein said pressure groove is formed so as to become narrower and shallower as it
approaches the lead end of the wheel-less wiring head.
